

GPS Safety Summary



Cerium dioxide

Chemical Identity

<i>Brand names</i>	Opaline®; Actalys HSA	<i>CAS number(s)</i>	1306-38-3
<i>Chemical name (IUPAC)</i>	Cerium (IV) oxide	<i>Molecular formula</i>	CeO₂
		<i>Molecular weight</i>	172.114 g/mol

Applications

Cerium dioxide is mainly used as such or in formulation as a high precision polishing agent for glass products, as catalyst or catalyst support for other applications and as raw material for the production of glass and ceramics as well as additives in paints and varnishes

Safety Assessment, Exposure and Risk Management Recommendations

Physical and chemical properties

Property	Result
Physical state	Solid
Form	Powder
Colour	White ivory to pale beige
Melting point	> 400°C
Flammability	Non flammable
Vapour pressure	No potential for volatilisation
Water solubility	Very low water solubility

Health effects



Cerium dioxide is not classified as dangerous for human health based on available data. For industrial uses, safety measures must be observed. For details, please refer to the Safety Data Sheet.

For consumer applications, cerium dioxide is used in suitable concentrations according to appropriate regulations.

Environmental effects



Cerium dioxide is an inorganic substance of very low water solubility. Although it is not biodegradable, it does not bioaccumulate. Emissions in the air are not expected. It is not considered as dangerous for the environment.

Disposal, treatment or recycling must comply with applicable regulations to preserve environment.

Regulatory information and certifications

Classification and labelling

EU regulation (EC) 1272/2008 (CLP)

Classification

Cerium dioxide is not classified as dangerous regarding physical and chemical hazards and it is classified neither for human health nor for environment, according to the regulation criteria.

Labelling

No pictogram, no signal word, no Hazard or Precautionary statement.

Registration and certification

EU regulation on chemicals (EC) 1907/2006 (REACH)
ISO 9001: 2008 certified

GPS Safety Summary

This Product Safety Summary is intended to provide a general overview of the chemical substance in the context of ICCA Global Product Strategy. The information on the Summary is basic information and is not intended to provide emergency response information, medical information or treatment information. The summary should not be used to provide in-depth safety and health information. In-depth safety and health information can be found on the (extended) Safety Data Sheet (e)SDS for the chemical substance.

Cerium dioxide

General Statement

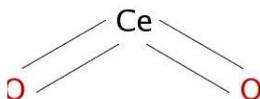
Cerium dioxide is an inorganic solid, mono-constituent, appearing under the form of a white ivory to pale beige powder. It is not classified as dangerous for human health and for environment, based on available data.

Cerium dioxide is mainly used as such or in formulation for industrial purpose as a high precision polishing agent for glass products, as catalyst or catalyst support for other applications and as raw material in several applications.

Cerium dioxide use in consumer products is minor, it may be found in wood protection products where it is formulated in suitable concentrations according to appropriate regulations to ensure safe use.

Chemical Identity

Name:	Cerium dioxide
Brand names:	Opaline®, Actalys HSA
Chemical name (IUPAC):	Cerium (IV) oxide
CAS number	1306-38-3
EC number:	215-150-4
Molecular formula:	CeO ₂



Manufacture, uses and applications

Bulk cerium dioxide is manufactured using conventional closed stirred reactors. The aqueous solution of Rare Earths salts is first neutralised. After reaction completion, the suspension of solids is filtered. The wet solid pulp may be then dried and/or calcined. The solid dried material may be grinded to adjust particle size. The material is then analysed for quality and packaged.

Cerium dioxide is used as such or in formulation mainly in industrial polishing. It is used as a raw material for the production of glass and ceramics as well as additive in paints and varnishes

It is used also in thermal spraying for welding and soldering products and for metal surface treatment products.

Nano cerium dioxide is manufactured from an aqueous solution of Rare Earths salts in a closed reactor. After addition of an acid, the solution is diluted with demineralized water and neutralized with a base. All these steps are made in a closed system.

Cerium dioxide powder with the finest particle size is used for industrial polishing.

Nano form, always in solution, is also used in varnishes formulation in wood protection products for professional and consumer uses.

Physical/Chemical Properties

Phys/Chem Safety Assessment

Property	Value
Physical state	Solid at 20°C and atmospheric pressure
Form	Powder
Particles size (D50)	41 nm to 20 µm
Colour	White ivory to creamy white-pale beige
Molecular weight	172.114 g/mol
Melting Point	> 400°C
Relative density	7.2 at 20°C
Boiling Point	> 400°C
Flash point	No data needed (inorganic substance)
Flammability	Non flammable
Explosive properties	Non explosive
Self-ignition temperature	> 400°C
Vapour pressure	No data needed (melting point > 300°C)
Water solubility	<0.123 µg/l at 20°C, very low water solubility
Octanol Water partition coefficient (log Kow)	No data needed (inorganic substance)

Regarding physical and chemical hazards, cerium dioxide is not classified according to regulation (EC) 1272/2008.

Health Effects

Human Health Safety Assessment

Effect Assessment	Result
Acute Toxicity Oral/inhalation/dermal	Not classified for acute toxicity whatever the route of exposure
Irritation / corrosion Skin/eye	Not classified for skin irritation Slightly irritating to the eyes but not resulting in classification
Sensitisation	Not classified for skin sensitisation
Toxicity after repeated exposure Oral/inhalation/dermal	Not classified for repeated toxicity based on oral and inhalation studies results Dermal study are not needed regarding regulation (results on oral and inhalation routes are sufficient)
Genotoxicity / Mutagenicity	Not classified for either mutagen or genotoxic properties
Carcinogenicity	No data available but no evidence of mutagenicity or pre-neoplastic lesions were observed in genotoxicity or repeated dose toxicity studies on constituents
Toxicity for reproduction	No relevant effect observed on fertility and developmental toxicity

All these results are based on available data. Regarding toxicological hazard, cerium dioxide is not classified according to EC 1272/2008 regulation criteria.

Environmental Effects

Environment Safety Assessment

Effect Assessment	Result
Aquatic Toxicity	<ul style="list-style-type: none"> - Micrometric cerium dioxide: <ul style="list-style-type: none"> - Short-term exposure: Not harmful to fish, algae, aquatic invertebrates and micro-organisms - Long-term exposure: Not harmful to aquatic invertebrates and algae No long-term data available on fish - Nanometric cerium dioxide: <ul style="list-style-type: none"> - Short-term exposure: Not harmful to fish, aquatic invertebrates and micro-organisms Harmful to algae - Long-term exposure: No adverse effect on aquatic invertebrates and algae up to 1 mg/L (threshold value taken into account for classification) No long-term data available on fish

Fate and behaviour	Result
Biodegradation	Not applicable to inorganic substances
Bioaccumulation potential	- Micrometric cerium dioxide: By analogy, it should not show any potential for bioaccumulation - Nanometric cerium dioxide: No potential for bioaccumulation
PBT / vPvB conclusion	Not applicable to inorganic substances

Based on available data, cerium dioxide, under both the micrometric and nanometric forms, is not classified as dangerous for the environment, according to EC 1272/2008 regulation.

Exposure

Human health

From manufacture to industrial or professional uses, workers' exposure is controlled by suitable risk management measures. Consumers may only come in contact with the substance in formulation when using, for example, wood protection products.

Cerium dioxide is manufactured in a process which ensures that the risk is controlled. Where workers have a potential for exposure, during (un)loading, mixing, sampling, analysis or maintenance operations, the exposure must be kept at a safe level (strictly below occupational exposure limits, when applicable) by the use of appropriate risk management measures such as suitable collective and personal protective equipment, good industrial hygiene practices and risk communication through appropriate training of workers, as indicated in the Safety Data Sheet.

In end-use products, cerium dioxide is formulated to comply with requirements of the most stringent regulations for all applicable consumer uses to ensure that the final products are used safely in the conditions of use written on the packaging.

Environment

Cerium dioxide is an inorganic solid substance which is characterised by a very low water solubility. If released into the aquatic environment, the concentrations reached will be very low and should not trigger any adverse effect on aquatic organisms. Due to its inorganic nature, it has no potential for biodegradation. On account of its insolubility, the ultimate target compartments will be soil and sediments. Cerium dioxide presenting a high melting point value, the vapour pressure, and thus the volatilisation potential and the emission to air can be considered as negligible.

On the industrial site, effluents are sent to the waste water treatment unit. The collected cerium dioxide is treated and stocked in order to be reused.

An indirect exposure of humans via the environment is not expected.

Risk Management Recommendations

Human health

For industrial uses of cerium dioxide and as recommended for the use of any chemical product, workers must be well informed and trained and must refer to the Safety Data Sheet (SDS) to handle the product in accordance with good industrial hygiene and safety practices.

In order to control possible risks during the handling of the substance (during (un)loading, sampling, analysis or maintenance operations), an adequate and efficient Local Exhaust Ventilation (LEV) should be provided at each point of dust emission. Appropriate personal protective equipment (PPE) selected according to potential exposure conditions (especially according to the application), handling practices, concentration and LEV efficiency should be worn (safety glasses, suitable gloves and protective suit in case of skin contact). In case of exposure to dust, a respirator with approved filter should be used. General industrial hygiene measures are required to ensure safe handling of the substance: Use well-maintained PPE; wash hands and skin following contact; do not eat, drink or smoke at the workplace.

For consumer uses, cerium dioxide is formulated in suitable concentrations, according to appropriate regulations, to ensure safe use of the final products, in the conditions of use written on the packaging.

Environment

All effluent releases that may contain the substance must be directed to a waste water treatment plant to avoid discharge in the environment.

Disposal, treatment or recycling of industrial waste must comply with applicable regulations to preserve environment.

State Agency Review

This substance has been registered under the EU Regulation (EC) 1907/2006 (REACH).

Regulatory Information / Classification and labelling

Substance classification and labelling according to EU regulation (EC) 1272/2008 (CLP):

Classification

Cerium dioxide is not classified regarding physical and chemical hazards and is not classified either for human health or for environment.

Labelling

No pictogram, no signal word, no Hazard or Precautionary statement.

Contact information within company

For further information on this substance or Product Safety Summaries in general, please contact:

Rhodia Global Product Strategy: http://www.rhodia.com/en/sustainability/global_product_strategy/index.tcm

Contact: globalproductstrategy@eu.rhodia.com

Additional information

ICCA Global Product Strategy: <http://www.icca-chem.org/en/Home/ICCA-initiatives/global-product-strategy/>

(extended) Safety Data Sheet available on demand: http://www.rhodia.com/en/contact/contact_form_business.tcm

Glossary of technical terms: http://www.rhodia.com/en/sustainability/global_product_strategy/glossary/index.tcm

Date of issue: September 2012

Revision: 0

Disclaimer

The information provided in the present Safety Summary is based on European data available in REACH regulatory dossier (EC N°1907/2006) and is correct to the best of our knowledge, information and belief at the date of its publication. Such information is only intended to provide a general overview of the chemical substance in the context of ICCA Global Product Strategy and is not to be considered as a warranty or quality specification. It does not replace the safety data sheet and technical sheets. Thus, the information provided in this Safety Summary only relates to the designated specific product and may not be applicable if such product is used in combination with other materials or in another manufacturing process, unless otherwise specifically indicated. It does not release the user from ensuring he is in conformity with all regulations linked to its activity.